61A Lecture 35

Monday, November 24

Announcements

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- No lab on Tuesday 11/25 & Wednesday 11/26
- The week of 12/1: Homework 10 due Wednesday 12/3 & Quiz 3 due Thursday 12/4 on SQL
  - The lab on SQL (12/2 & 12/3) will be an excellent place to get homework help

Distributed Computing

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Distributed computing for large-scale data processing:

- Databases respond to queries over a network.
- Data sets can be partitioned across multiple machines (next lecture).

Network Messages

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- Protocols are designed to be implemented by many different programming languages on many different types of machines.

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0	0	*Version*				*IHL*				*DSCP*						*ECN*		*Total Length*															
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E.g., 192.168.1.1

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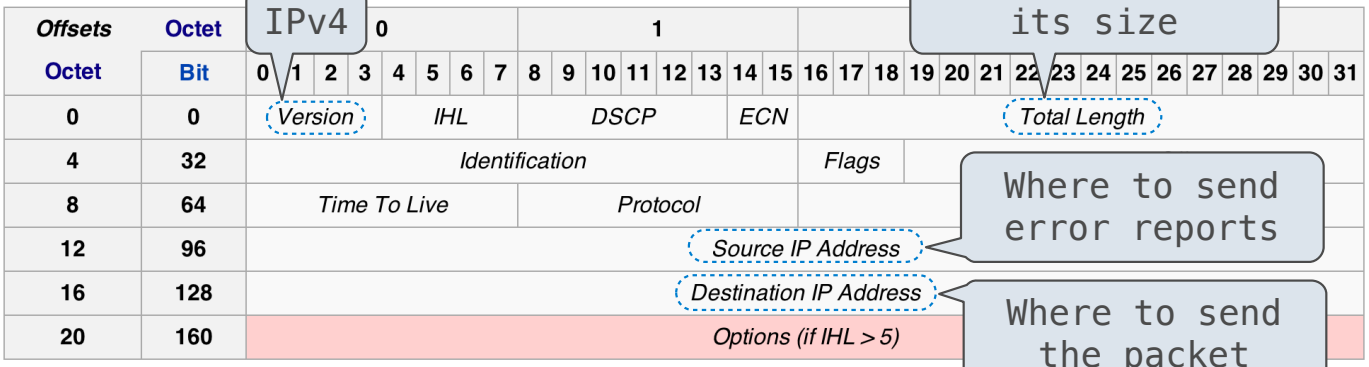

IPv4

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Max length: 216 = 65,536

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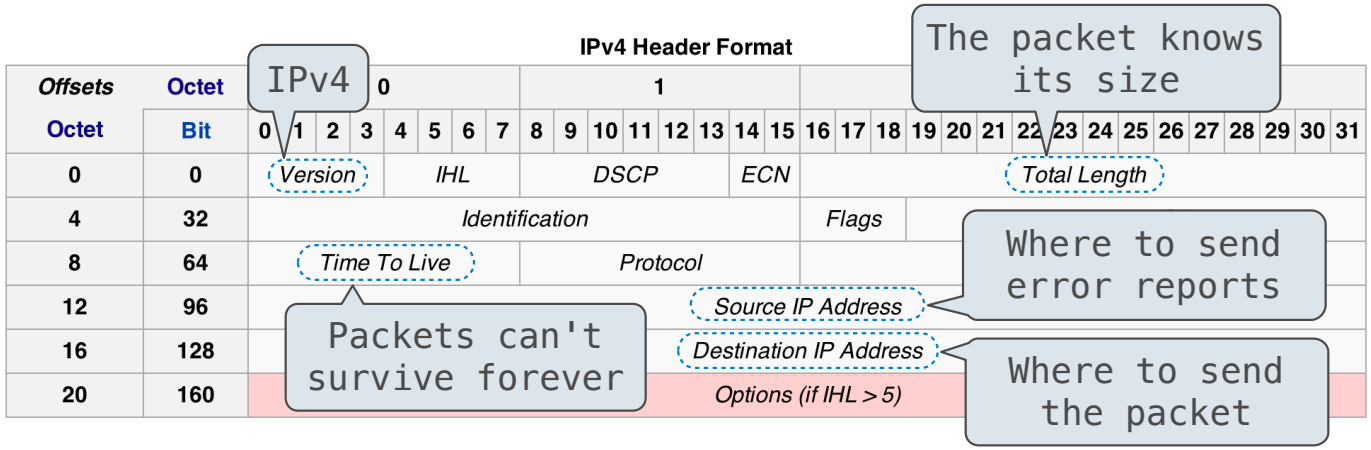

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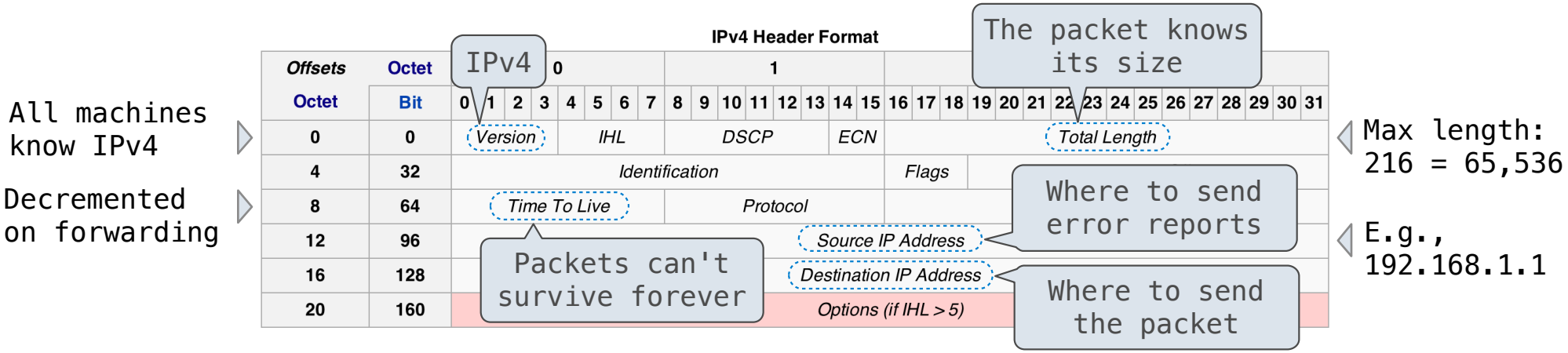

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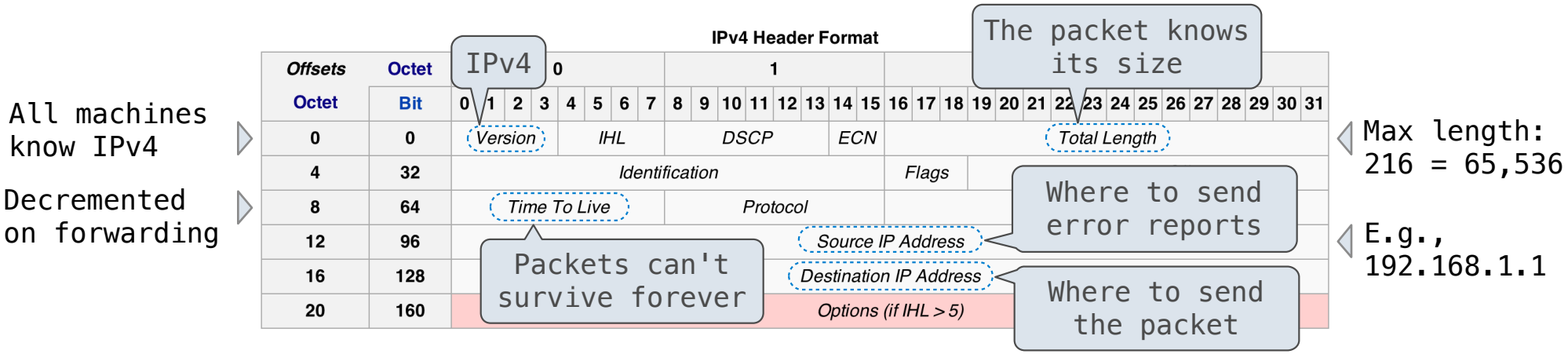

Packets are forwarded toward their destination on a best effort basis.

Programs that use IP typically need a policy for handling lost packets.

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The socket module in Python implements the TCP.

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- Computer A knows that it can send data to and receive data from Computer B.
- Computer B knows that it can send data to and receive data from Computer A.
- Lots of separate connections can exist without any confusion.
- The number of required messages is minimized.

Communication Rules:

- Computer A can send an initial message to Computer B requesting a new connection.
- Computer B can respond to messages from Computer A.
- Computer A can respond to messages from Computer B.

Message Sequence of a TCP Connection

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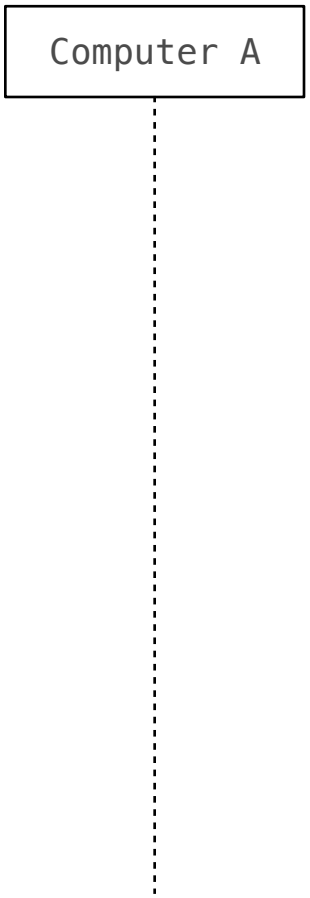

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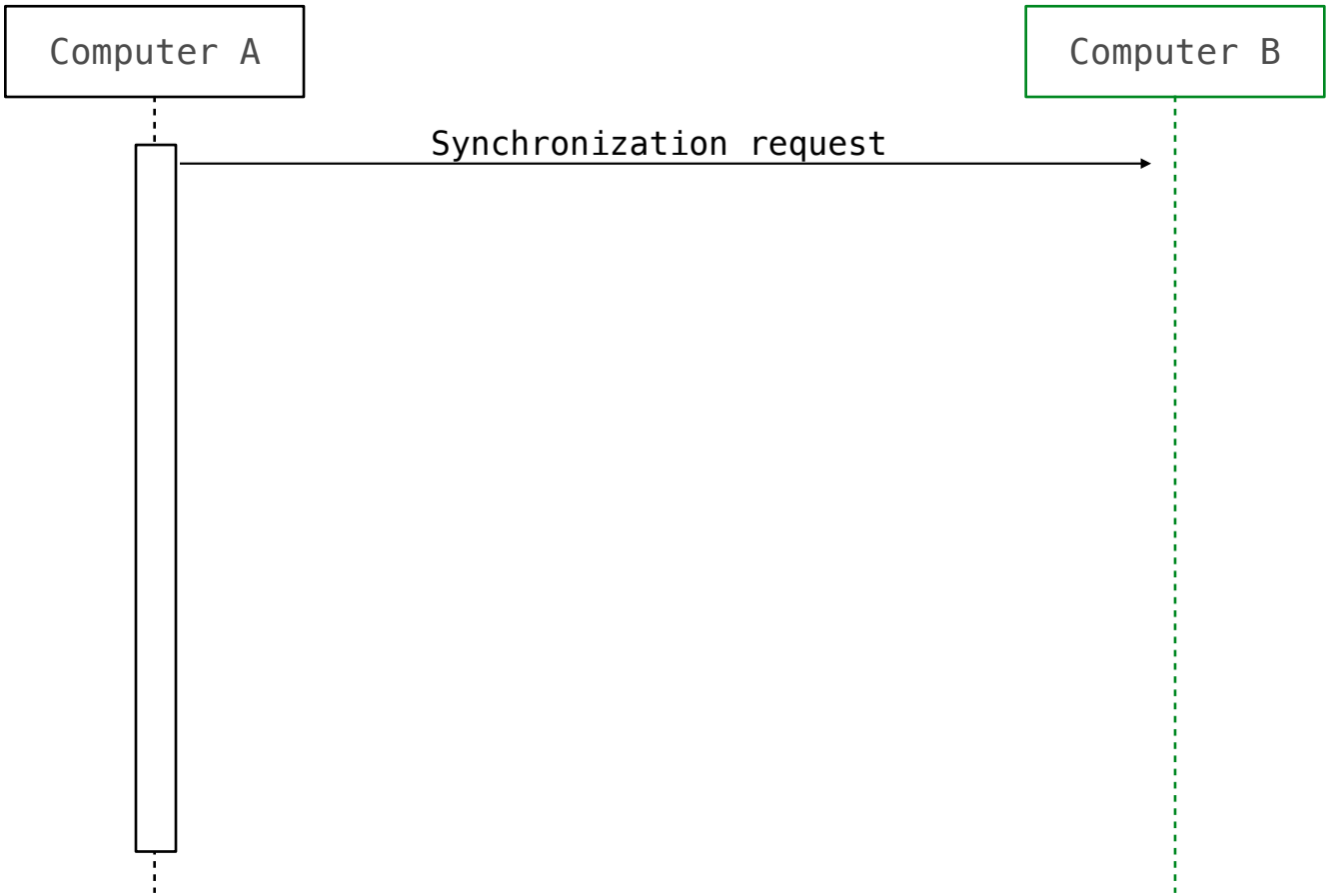

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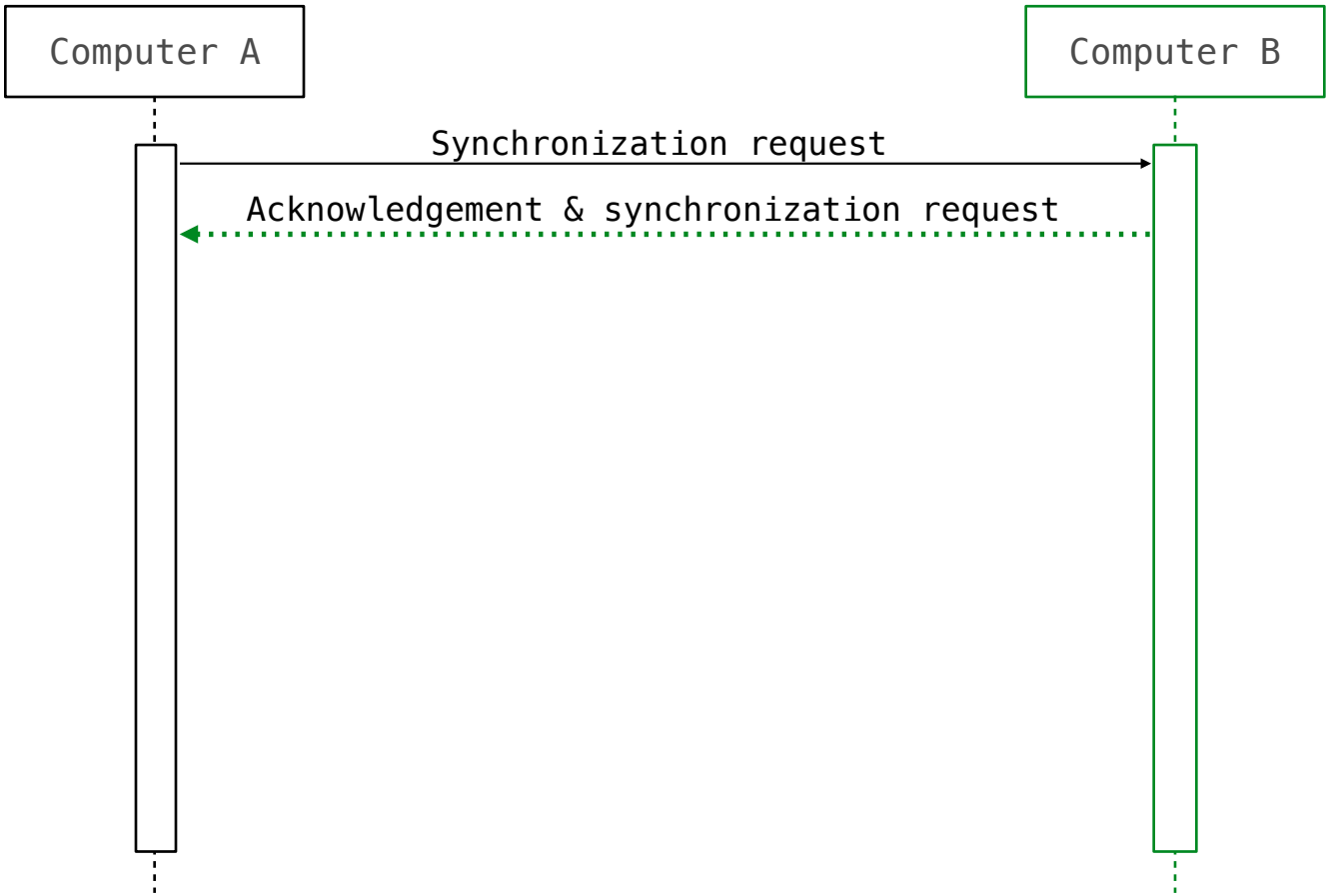

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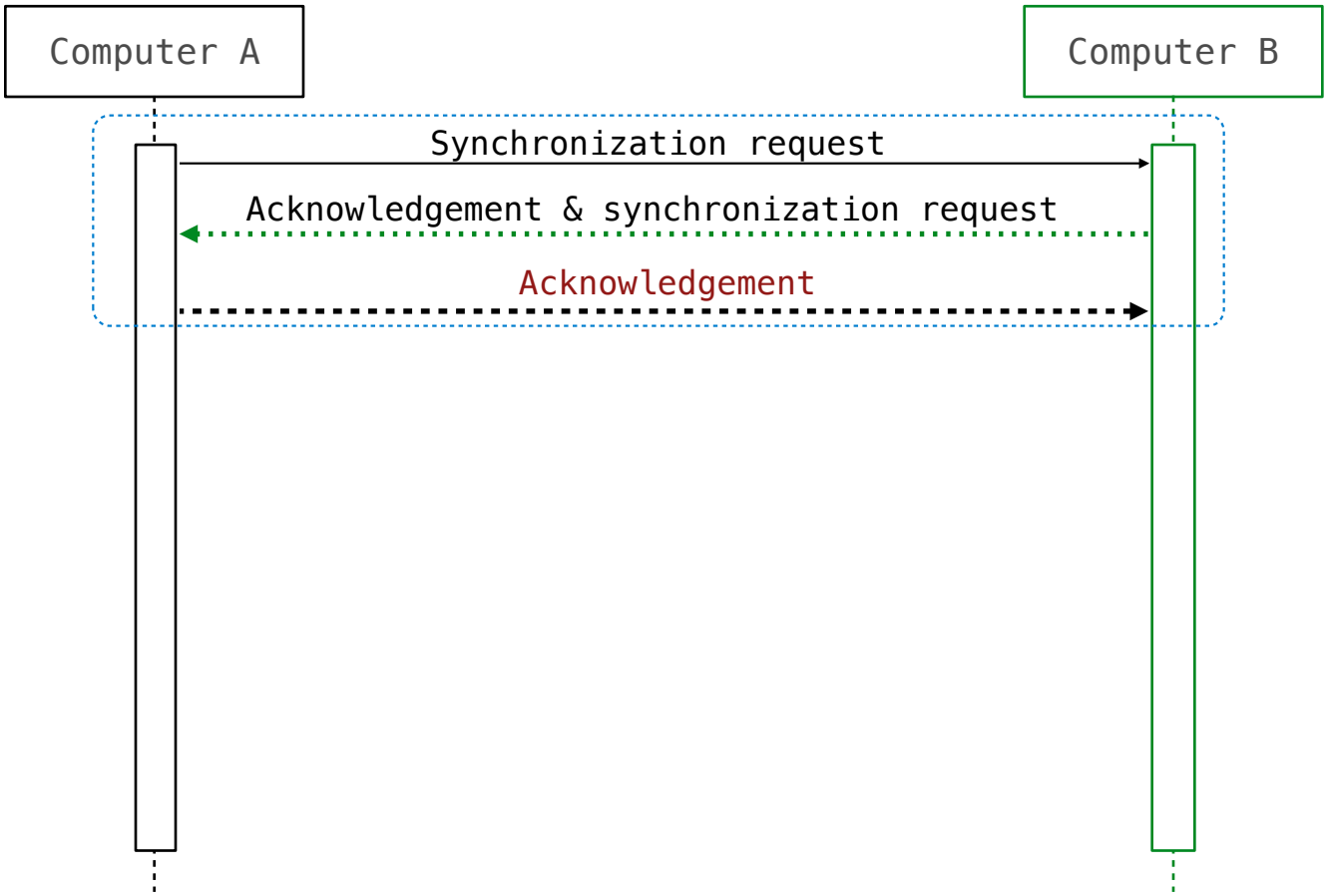

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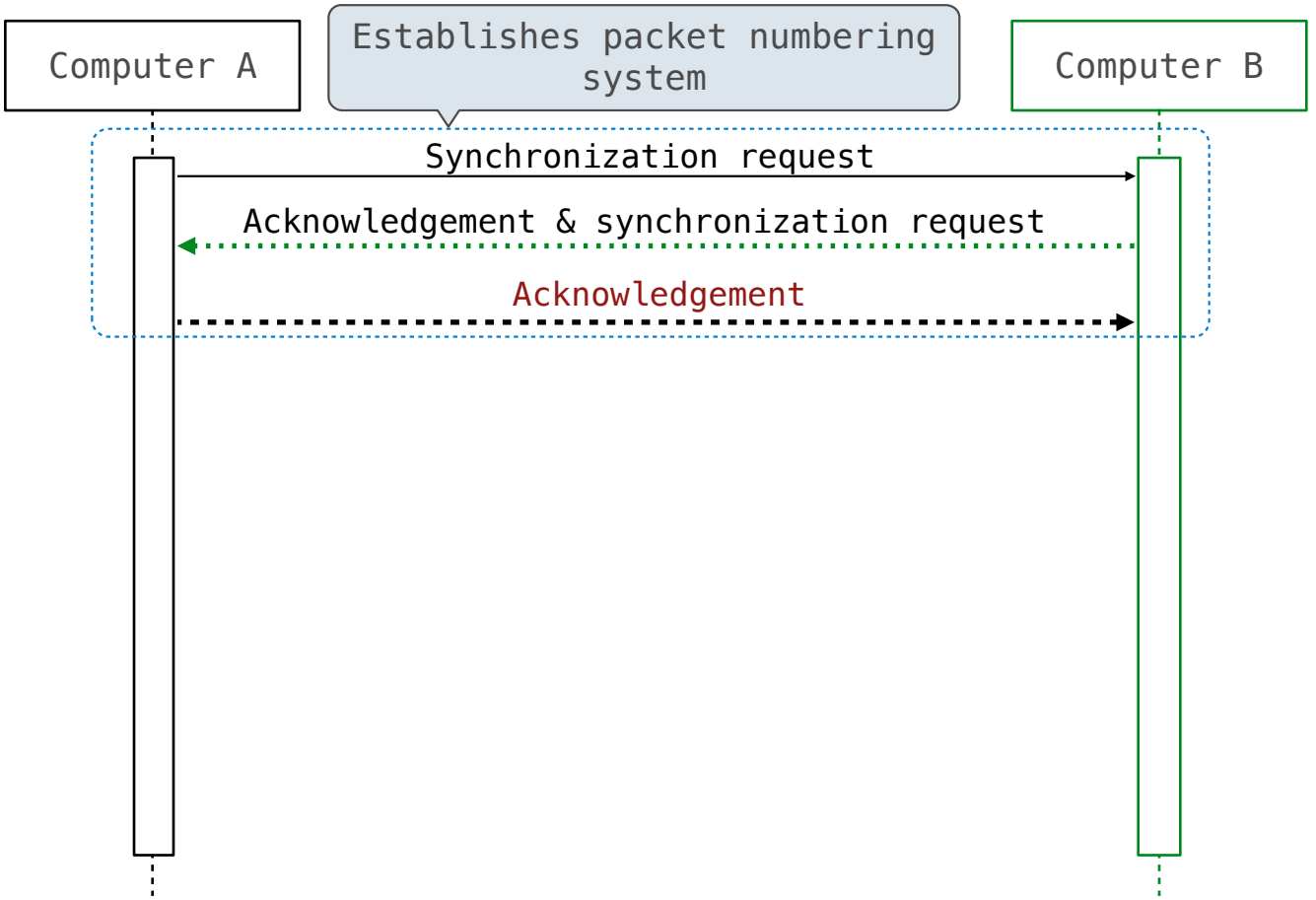

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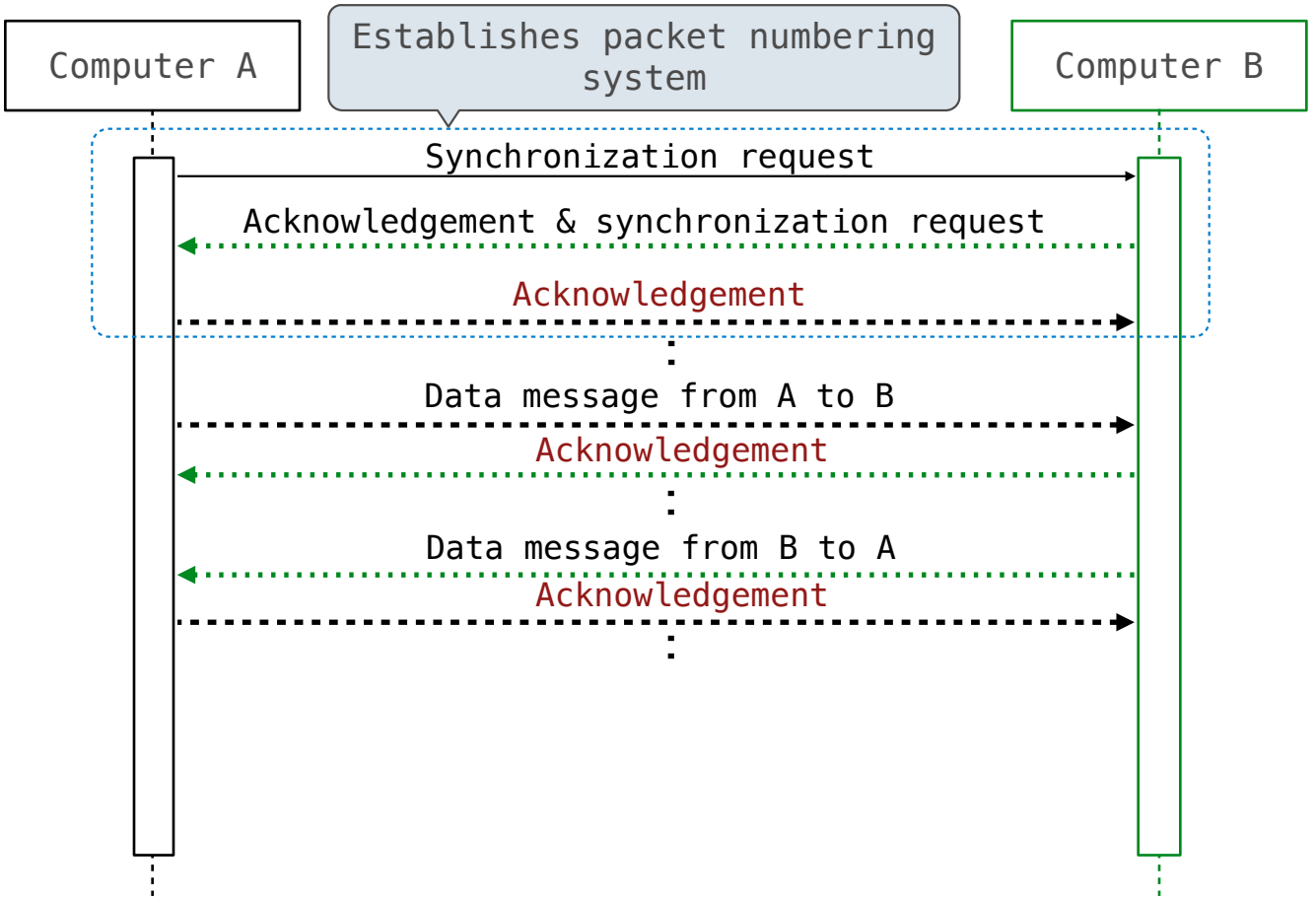

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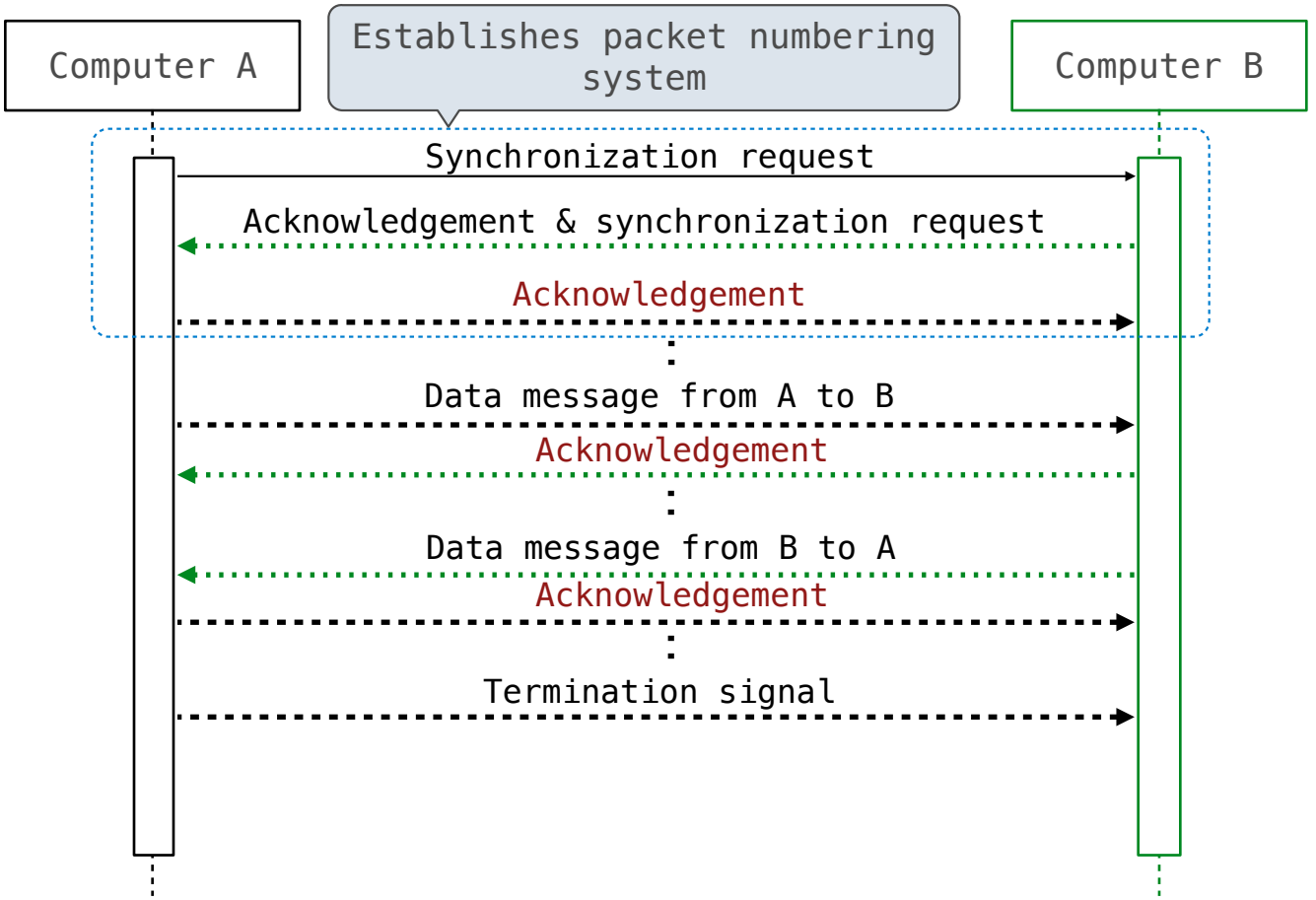

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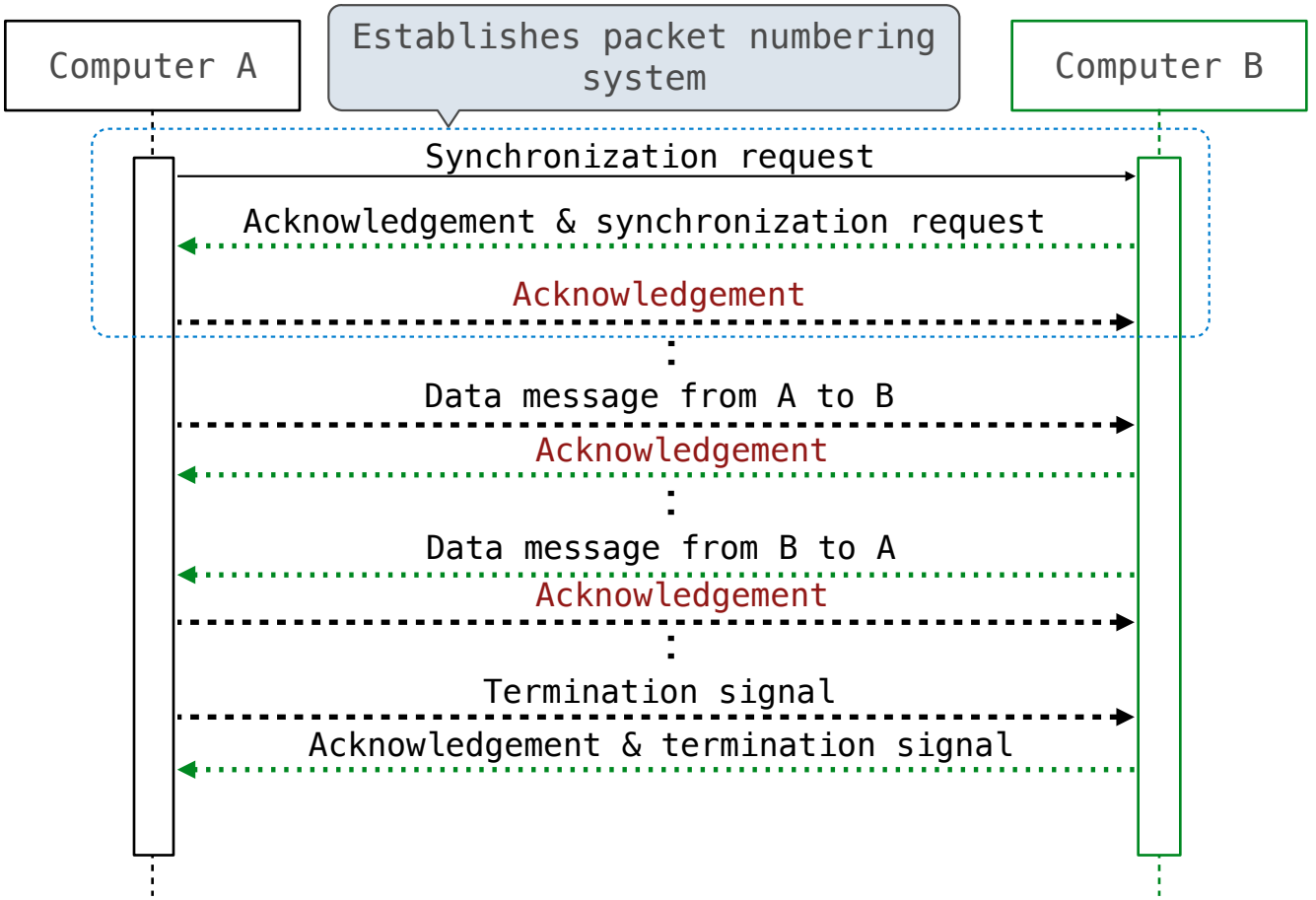

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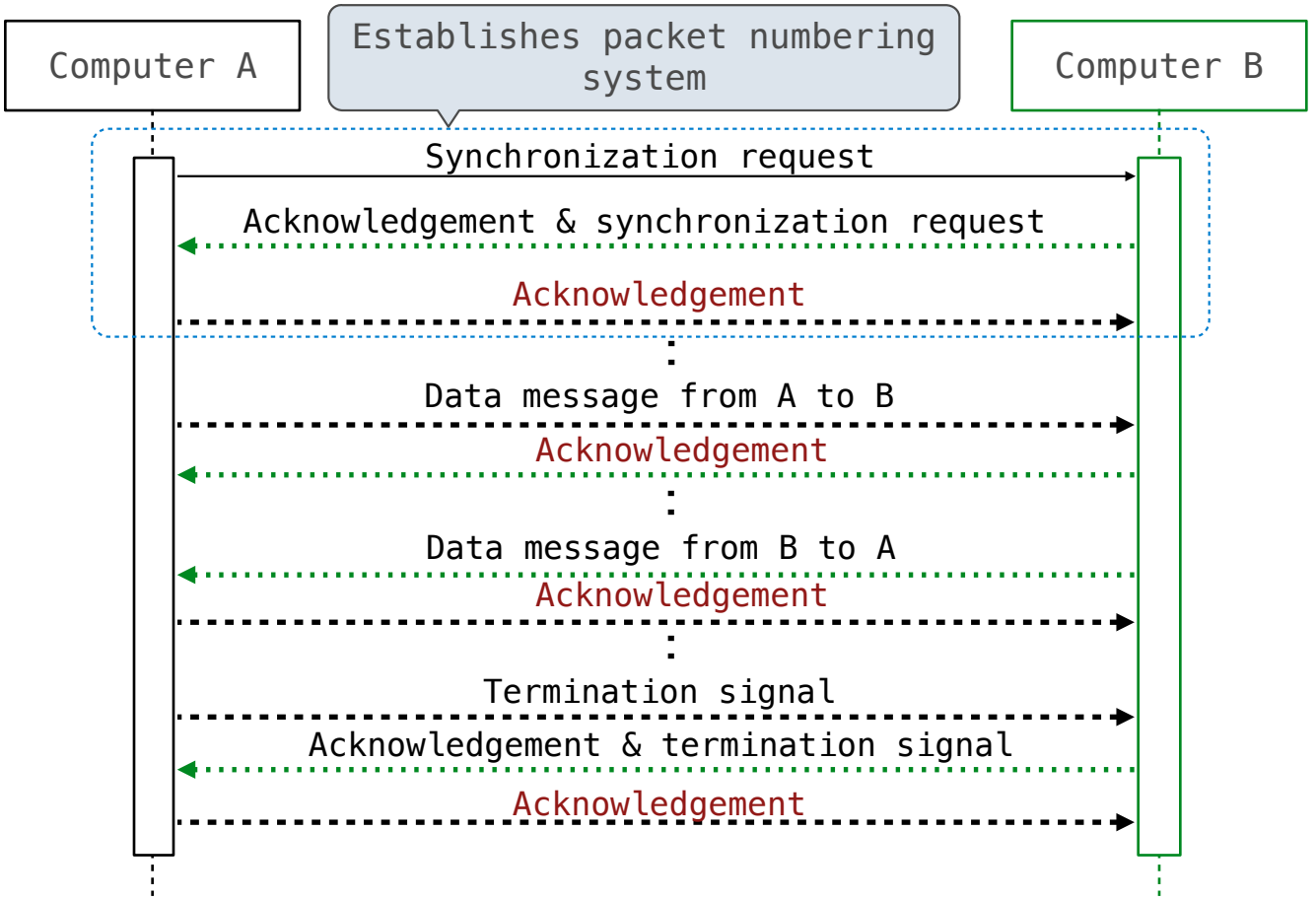

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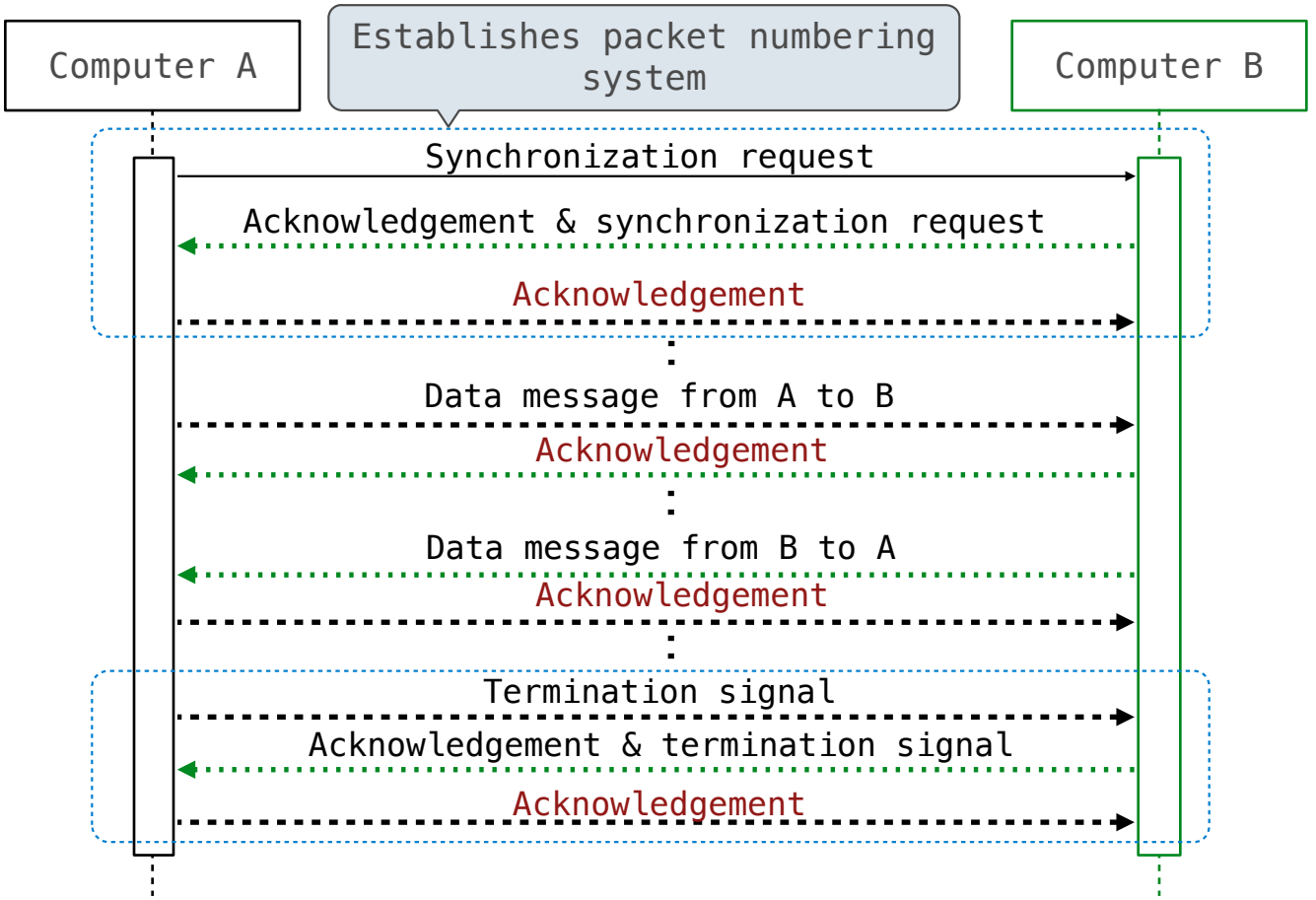

Client/Server Architecture

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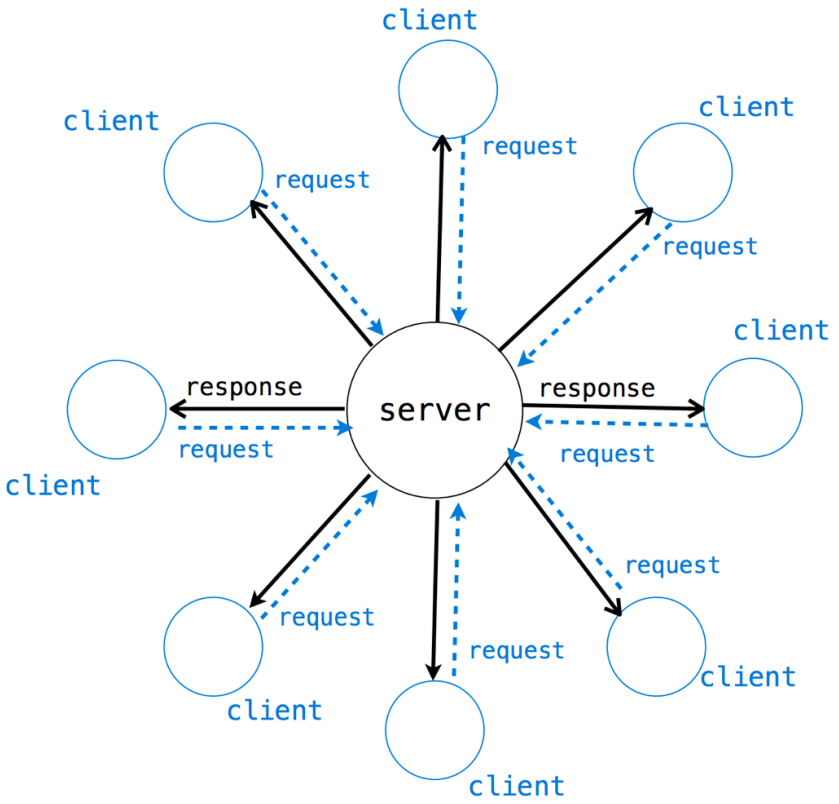

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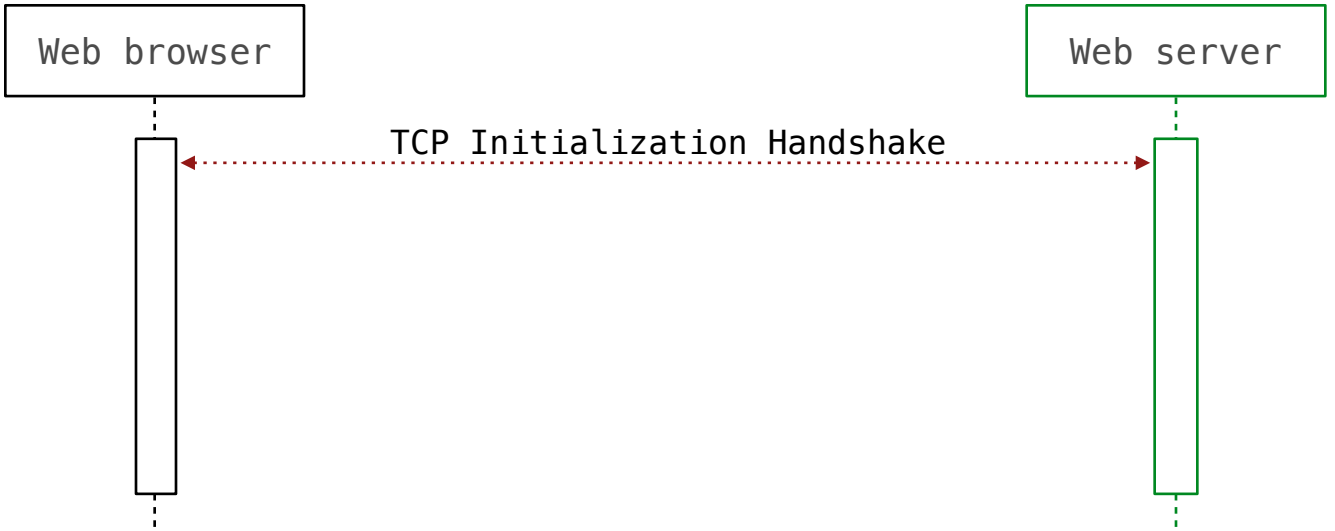

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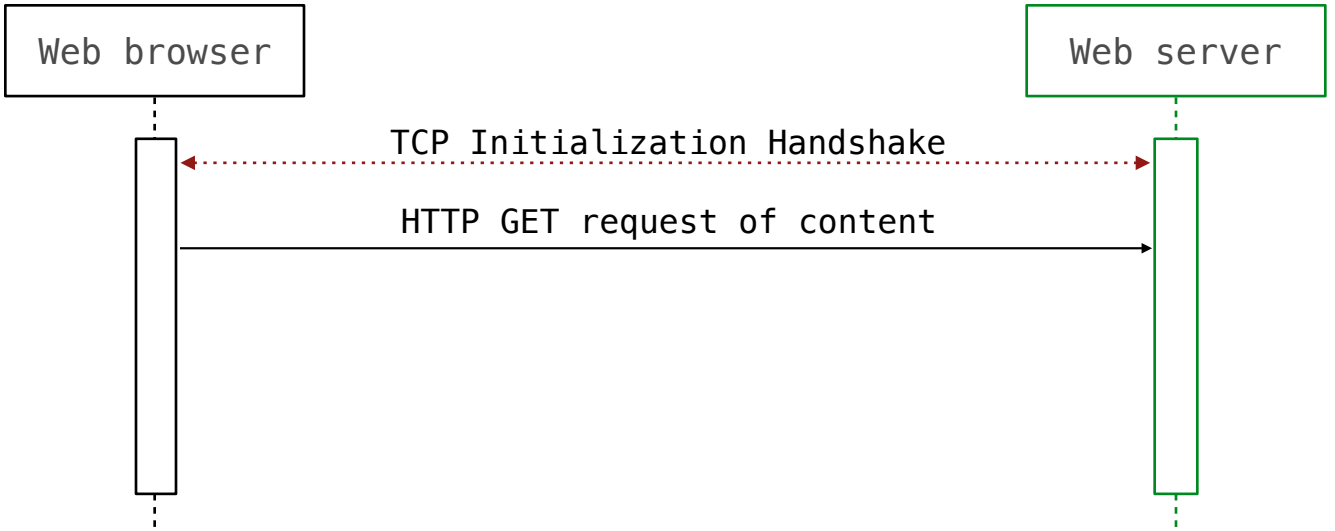

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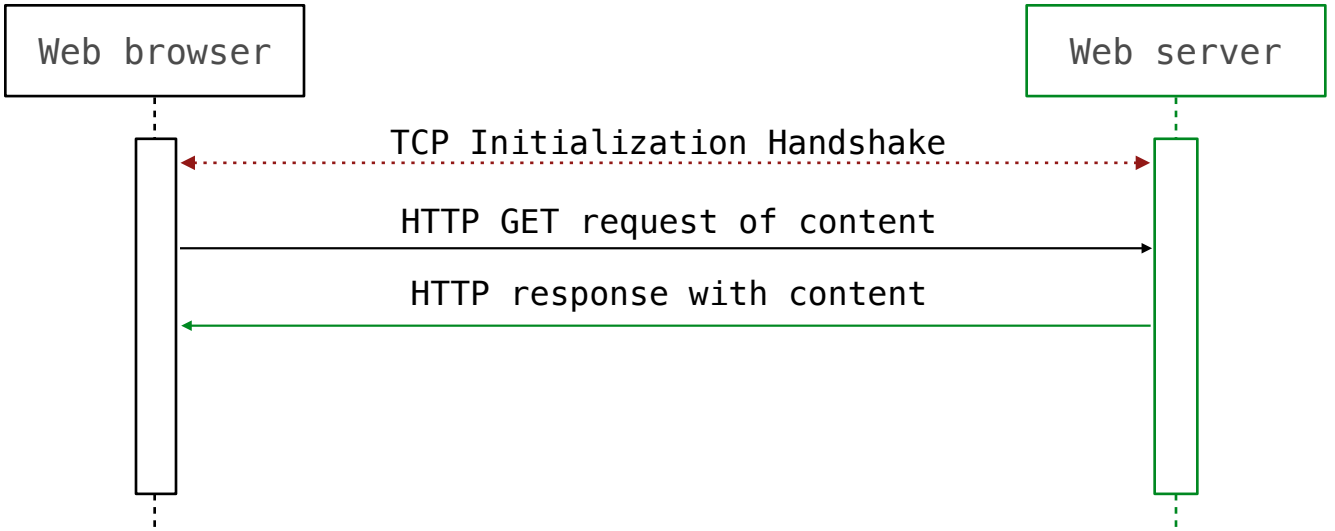

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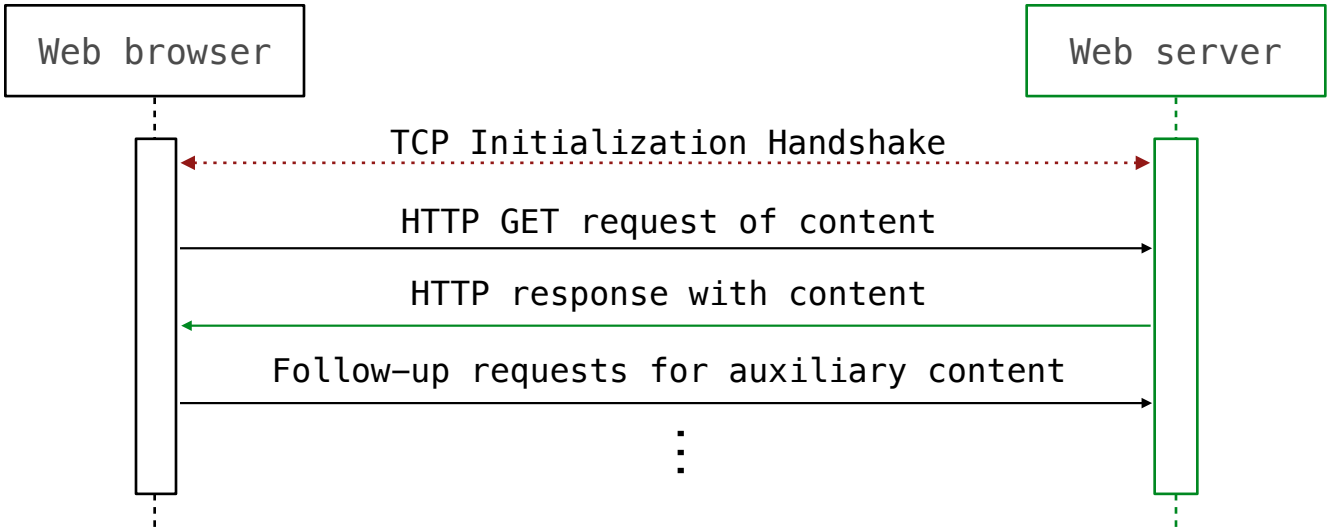

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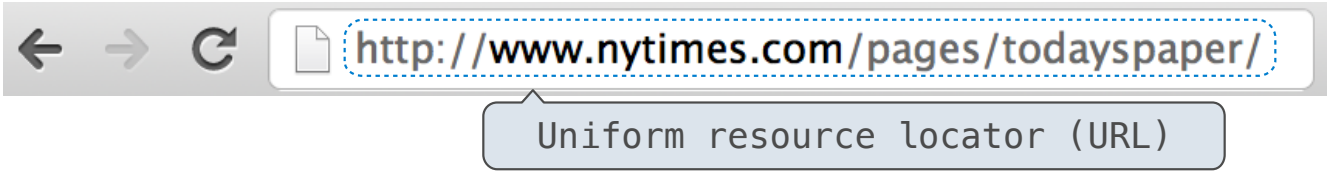

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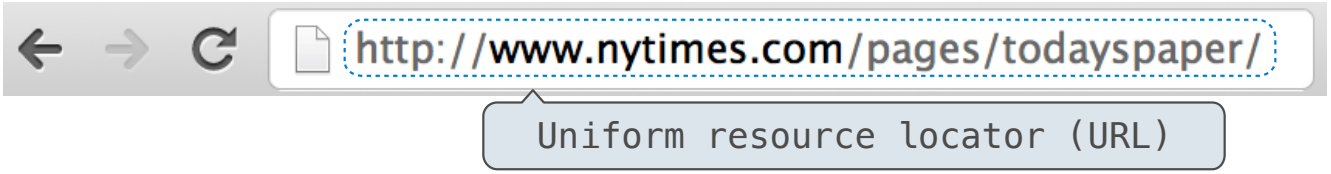

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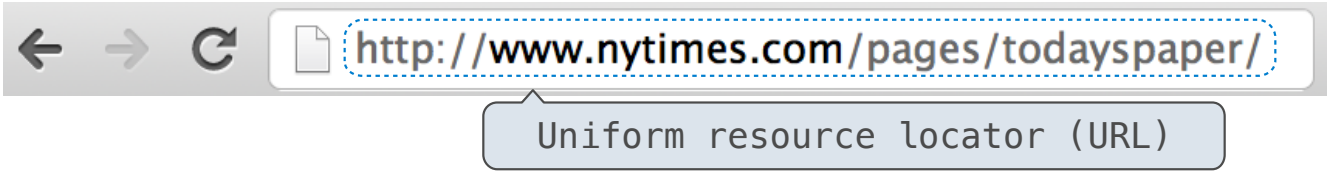

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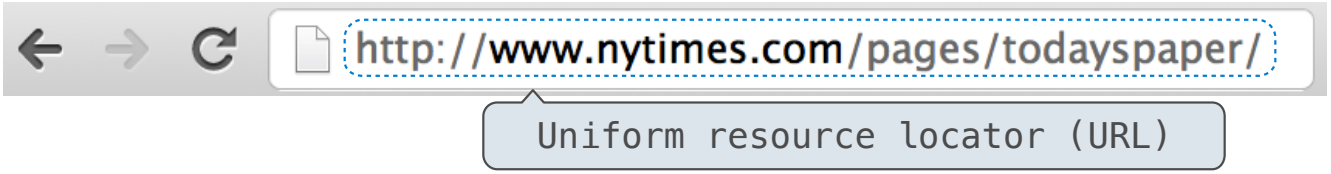

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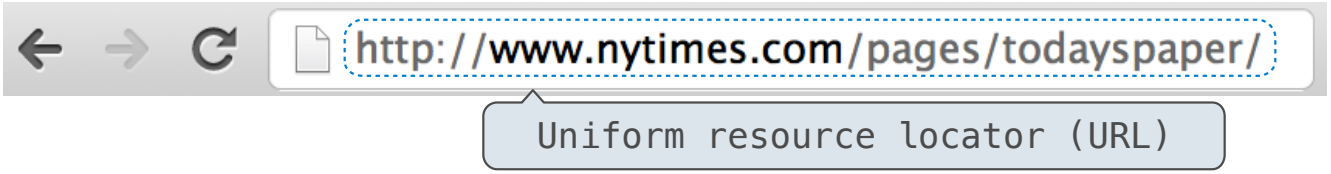

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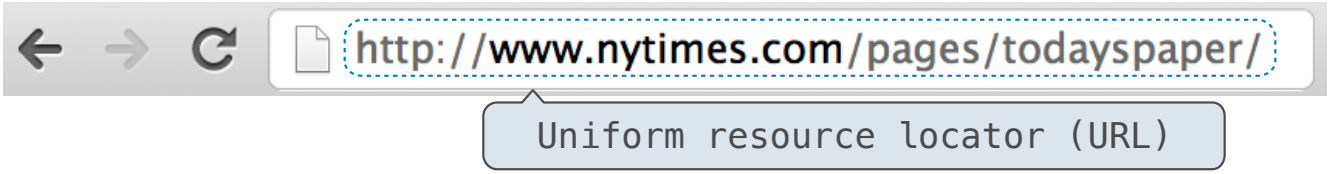

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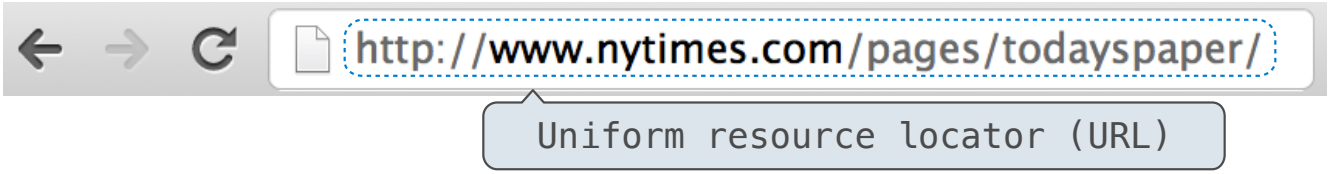

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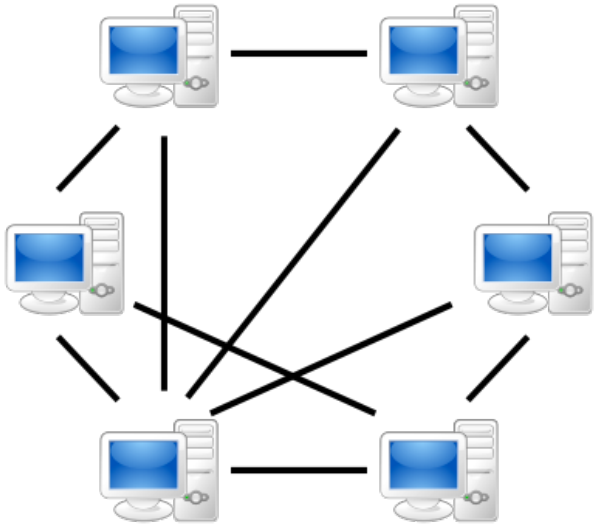

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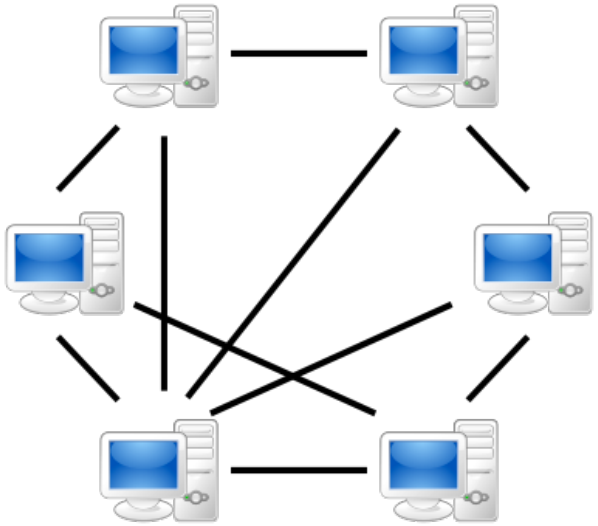

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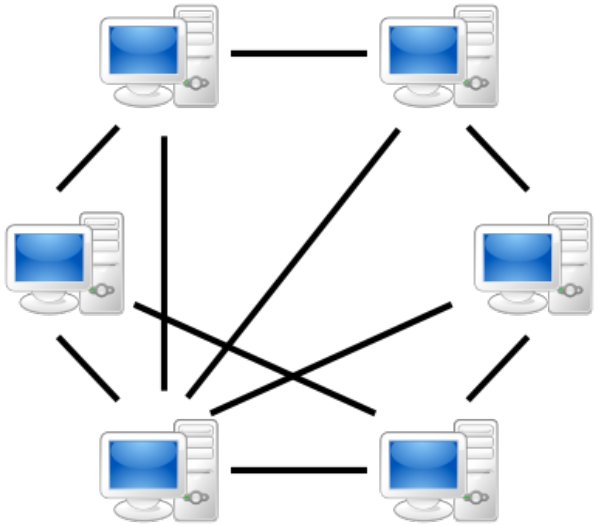

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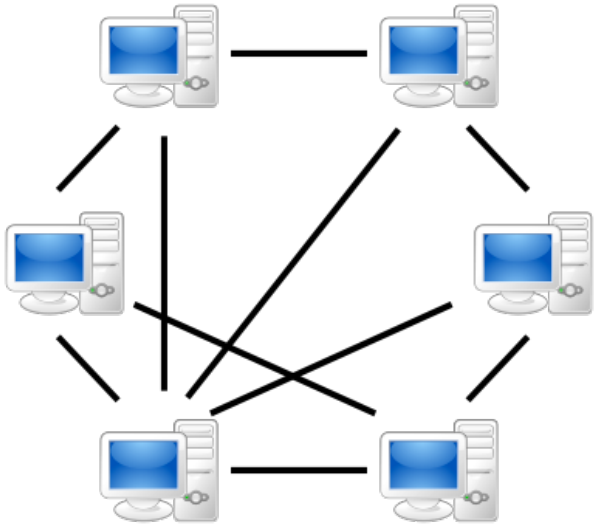

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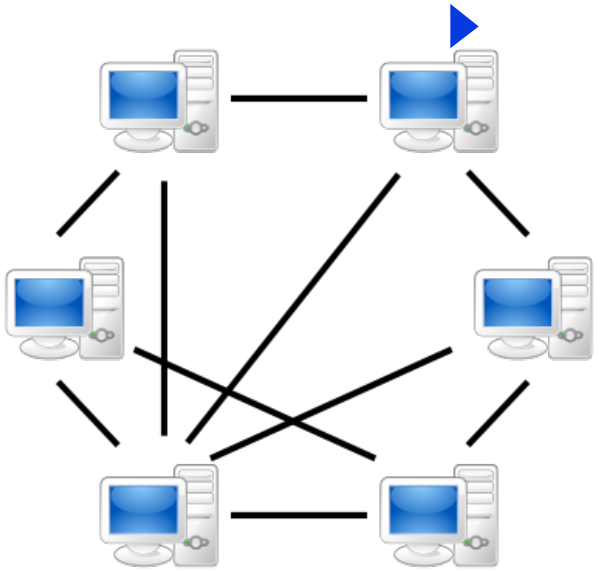

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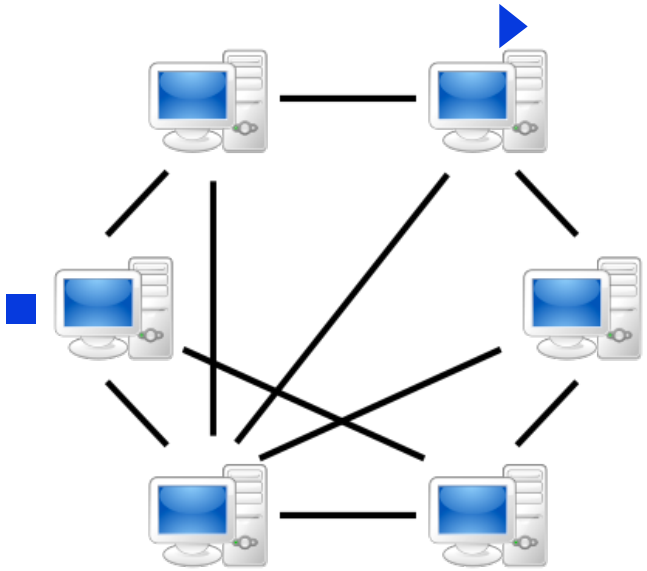

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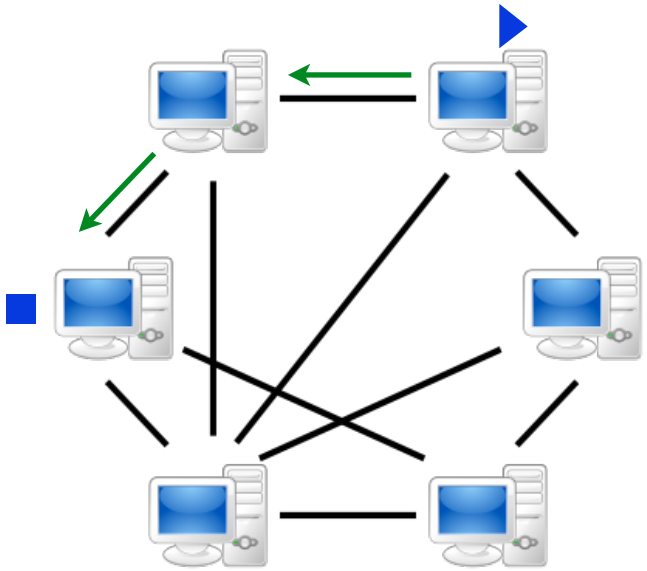

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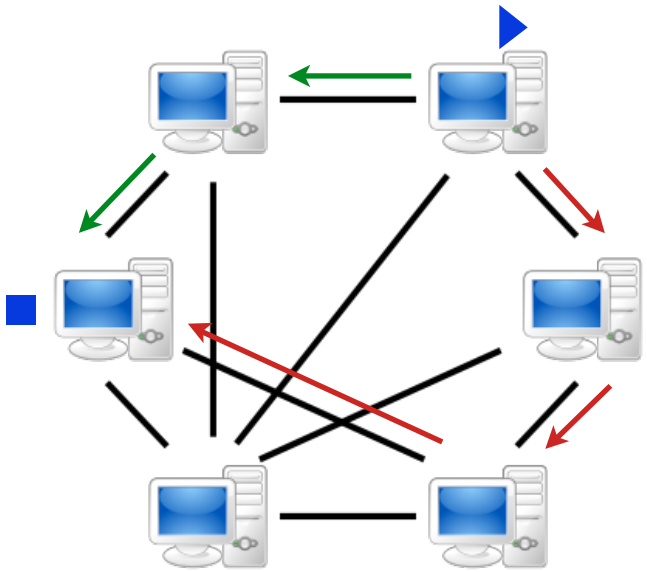

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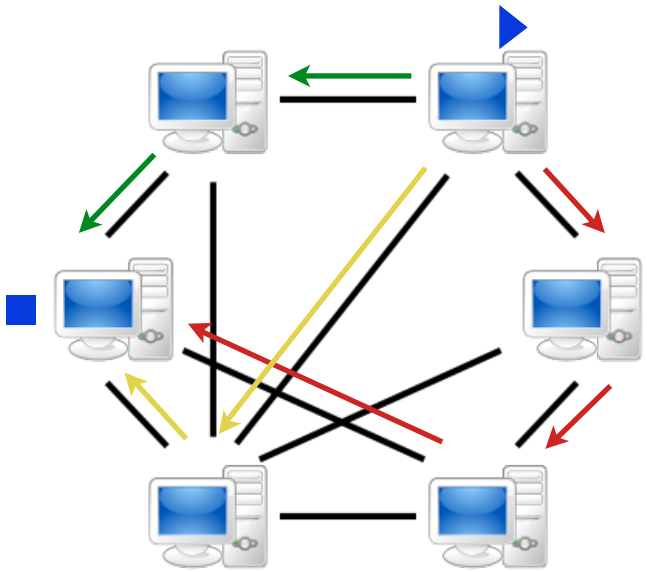

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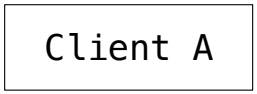

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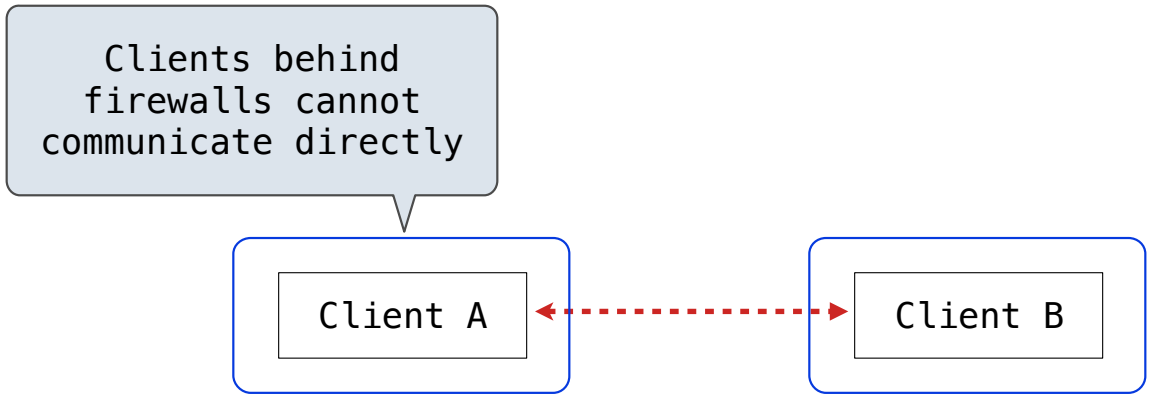

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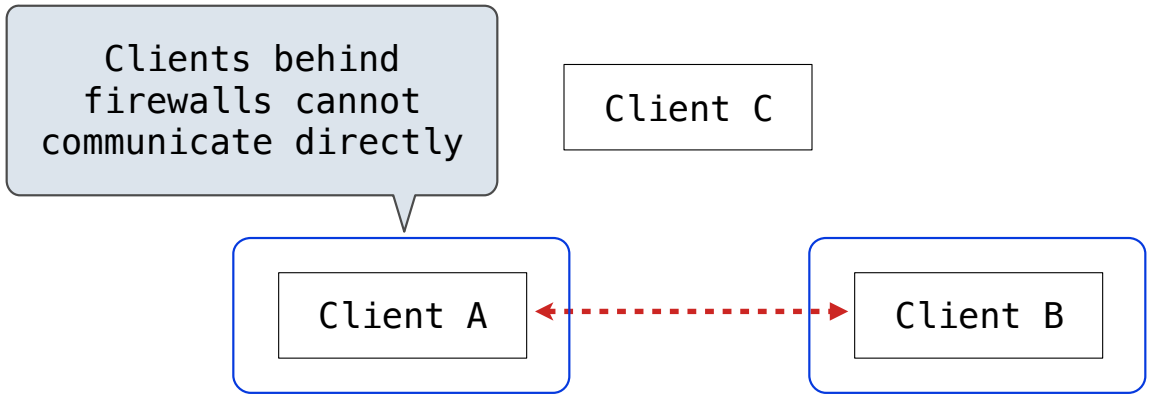

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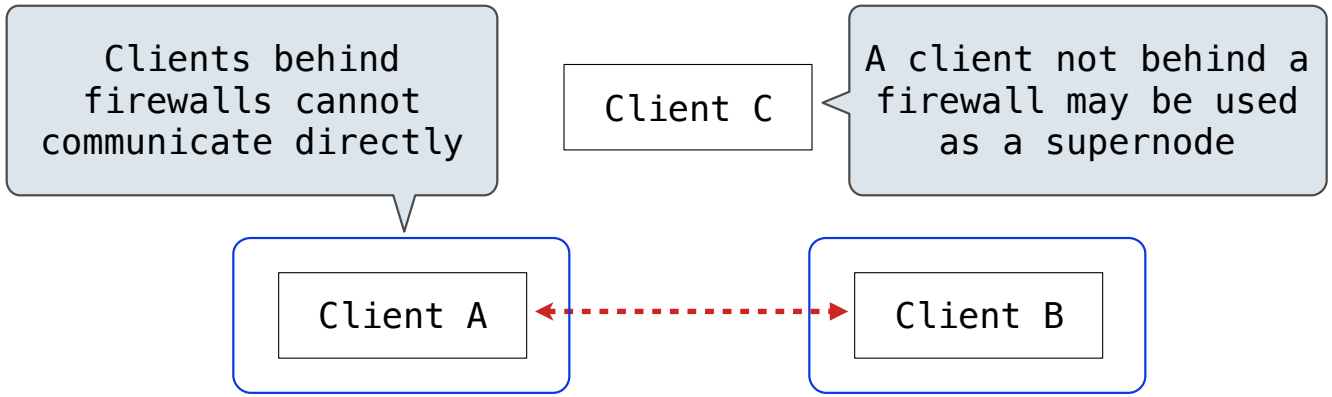

Example: Skype

Skype is a Voice Over IP (VOIP) system that uses a hybrid peer-to-peer architecture.

Login & contacts are handled via a centralized server.

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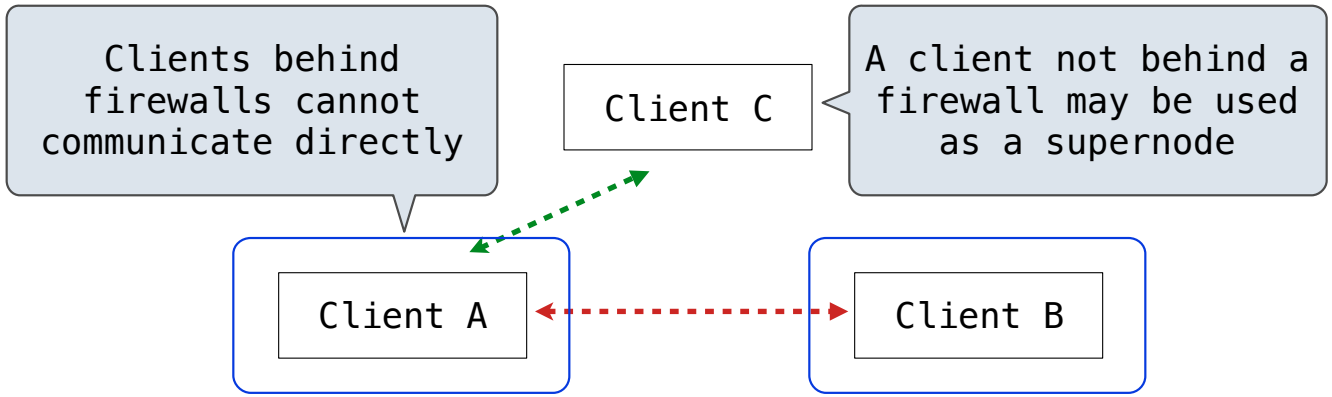

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